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COMMUNICATIONS.

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*Discovery of a New Anatomical Feature in Human Blood Corpuscles.*

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ARTICLE NO. I.

In the CHICAGO MEDICAL JOURNAL of May 15, 1868, Vol. XXV., No. 10, in a brief, hastily written article, I announced that I had, as I believed, discovered that human blood corpuscles "are not, as heretofore supposed, simply bi-concave disks; but, on the contrary, there may be seen, (by the use of Wale's Illuminator,) a nipple-like eminence in the center of the concavity of each well-formed disc. This papillary eminence is about .000,000,1 of an inch in diameter at its base. That it is a true anatomical form, and not a change incidental to dessication, etc., is shown by its

appearance at the instant of withdrawal of any given specimen, while the corpuscles are still plump and smooth in all other respects."

Continued investigation on this important subject has served only to confirm the announcement then made; and having had the opportunity of exhibiting corpuscles as herein described, to several eminent men of acknowledged scientific ability, and having received their opinion in corroboration of my own, I propose to set forth in this paper the views heretofore entertained upon this subject, and in contradistinction present my own more fully, illustrated by accompanying diagrams, which were drawn by an artist who had never before seen blood corpuscles, and, consequently to be taken as unprejudiced testimony.

Among physiologists and microscopic anatomists there has been but one generally expressed opinion as set forth in standard works, illustrated and otherwise; *to wit*, that the human blood corpuscle is non-nucleated.

It may appear incautious, and even rash, to array one's self against evidence so weighty, but my convictions have ripened under careful and persistent investigation, and I deem the announcement timely and worthy of earnest attention.

It may be superfluous to quote the opinions of authors with whom nearly all are familiar, but for a concise presentation of the subject I deem it advisable.

Todd and Bowman, in treating "of the structure of the red corpuscle" say: "The structure of the red corpuscle of most of the vertebrata may be readily demonstrated in the reptilia—that of the frog, for instance. It is distinctly a nucleated cell—consisting of a delicate cell membrane, within which is a granular nucleus, which may be rendered more distinctly granular by acetic acid. The nucleus is globular, and much smaller than the cell, and the interval between the inner surface of the latter and the outer surface of the former is filled by fluid which holds the coloring matter in solution. Corpuscles of this kind

floated in pure water become distended by the endosmosis of it, burst, and give exit to their nuclei, while the shreds of the cell-membrane are scattered in the fluid."

"It cannot be shown, satisfactorily, that the bi-concave, circular corpuscle of human blood and of that of mammalia is of the same structure as this, because it cannot be demonstrated to consist of cell and nucleus. If it be as the blood-corpuscles of birds, reptiles and fishes undoubtedly are, a nucleated cell, the obscurity of its nucleus is probably due to one of two causes; either it is so large as accurately to fill the cell, leaving no space between the outer surface of the one and the inner surface of the other, or it is so extremely minute as completely to elude our means of observation."

"Mr. Wharton Jones supposes that the mammalian red corpuscle is a nucleus, the cell of which has existed only in the earlier stages of development. Kölliker, on the other hand, affirms that the nucleous disappears while the cell wall is persistent. All that microscopic examination with the highest powers and the best instruments shows respecting the structure of this corpuscle is, that it consists of a delicate membrane, enclosing a semi-fluid material, impregnated with the proper coloring matter of the blood; and that this structure may truly be assigned to it is amply proved by the change of form which it undergoes by the endosmosis of pure water, which will cause it to burst, and evacuate its contents, consisting of nothing more than some minute granules, none of which can be compared to a nucleus. So far as microscopic analysis would enable us to decide this question, we should be disposed to declare in favor of Mr. Jones' view; but it seems greatly opposed by two facts; first, that in the corpuscle of the lower vertebrata, the coloring matter is contained between the nucleus and the cell-wall, whereas, in the mammalian corpuscle it would be contained in the nucleus; and, secondly, that this peculiarity of structure is limited to one class of vertebrate animals. It receives support, however,

from observing the several steps of the development, for the corpuscle exhibits a stage in which a nucleus is visible, (the stage of colored, nucleated cell,) and this nucleus, in the very large corpuscle of the elephant, and likewise in the very small corpuscle of the goat, exhibits a strict correspondence in size with the perfectly formed blood-corpuscles. But here, again, we notice the difficulty above referred to, that in this stage of nucleated cell, the color is found between the cell and the nucleus. It seems to us that further research is required, in order to determine the exact homology of the mammalian red corpuscle.

Mueller says: "The blood globules, both of the human and other mammiferæ ordinarily do not present the appearance of being nucleated, notwithstanding the generality of the presence of a nucleus in other classes render it probable that it also exists here. I believe, even, that by means of certain light I have sometimes been able to discover it in man. On treating human blood with dilute acetic acid the corpuscles suddenly disappear, and nothing remains but a few small granules, in regard to which one is in doubt as to whether they are or are not the nuclei of the globules."

Kölliker, in treating of the blood says: "The red blood-globules, more minutely examined, present the following characters:

Their form is usually that of a biconcave or plane, orbicular disc, with rounded borders, and, consequently, they present a different aspect to the observer, according as the surfaces or borders are turned towards him. In the former case they are pale-yellow, orbicular corpuscles, in which, according to the focussing of the microscopes, the slight central depression which always exists, is indicated, sometimes by an opaque spot in the center, the latter appearance admitting of being confounded with a *nucleus*. \* \*

\* \* \* The blood corpuscle is *constituted* of a very delicate, but nevertheless tolerably firm, and at the same time, elastic, colorless cell-membrane, composed of a protein substance closely allied to *fibrin*, and of colored viscid



contents formed of *globulin* and *hæmatin*, which, in the adult, present no trace of morphological particles or granules, or of a *cell-nucleus*; they are, consequently, vesicles, whence the name 'blood-cells' is to be preferred."

Longet says: "with man and other mammiferous adults the blood globules appear to be deprived of nuclei. There is not even an exception in the family *camelidæ*, which, by the form of their globules, approach to those in which the presence of nuclei is not doubtful. That which has been taken for a nucleus is but the thin, central part of the disc. This remark already made by Hodgkin and Lister, has been confirmed by Henle, Donné, Wharton Jones, etc., notwithstanding various Micrographers admit that sometimes among the ordinary globules without nuclei one meets with those that appear nucleated. Such, at least, is the result of the observations made by Wharton Jones, Schultz, Nasse and Busk with man and other mammifera."

As all investigators are so nearly in harmony on the subject of the anatomy of these organic forms, the methods of observation having been uniformly the same, it is deemed unnecessary to make further quotations.

In presenting my own views in contradistinction to the foregoing I wish to call especial attention to my method of investigation. Heretofore all examinations of blood corpuscles have been made by transmitted light, from which we might anticipate, *a priori*, that, with instruments of the same degree of perfection, similar results would be obtained. On the contrary, all of the research upon which my present convictions are based has been prosecuted by the use of reflected light; the object resting upon a polished jet slide.\*

The accompanying diagrams set forth faithfully the appearance made manifest by this method when properly pursued.

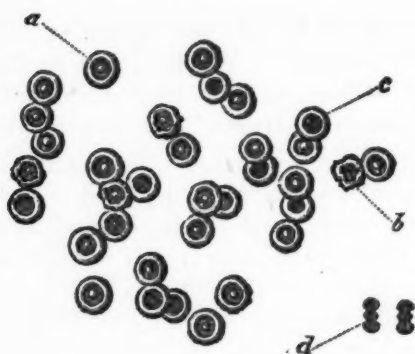


DIAGRAM I.

DIAGRAM I.—*a*, represents the perfect, human blood corpuscle. It will be seen that the center presents a slight elevation, surrounded by an annular depression, while the circumference of the disc is, comparatively, thick, smooth and rounded.

*b*, represents a disc with serrated and shriveled margin, with a perfect central elevation remaining.

*c*, a corpuscle without the central elevation.

*d*, is a hypothetical diagram of a disc placed upon its edge.

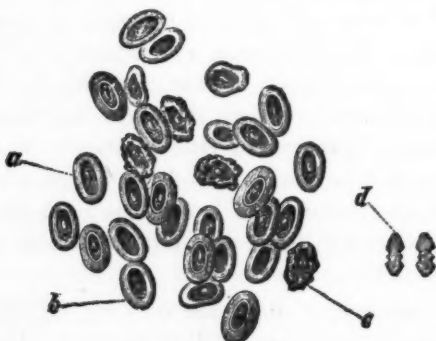


DIAGRAM II.

DIAGRAM II.—*a*, represents the perfectly formed, oval and characteristic disc, or globule, of the frog. In the cen-

tral portion may be seen an oval depression, in the center of which can be observed the elevation representing the nucleus. The margin is shown to be rounded, smooth and thickened.

*b*, is like the former in every respect except the central papilla is absent.

*c*, a shriveled corpuscle.

*d*, a corpuscle as it would appear set upon its edge.

It will be seen from the foregoing explanation that these bodies do not all possess a nucleus, or central elevation. In fact, there are in both the human blood and that of the frog a large proportion, perfect in every other respect, that do not possess this peculiarity. Whether this fact is due to an absence of this feature on one of the surfaces of the corpuscle or to its non-existence in a certain per centage of cases, I am undetermined.

I have, as yet, examined but few pathological specimens. In one instance, however, in a case of advanced Typhoid fever, the corpuscles, without exception, were found serrated, shriveled and distorted in the most remarkable manner, with the exception of the nucleated center. This seemed to maintain its integrity.

The reader, by reference to the diagrams, will observe that the corpuscles, both of the human and reptilian blood, are analogous in their general features, as, witness the elevated nuclei in the centers, the surrounding depression and the elevated margins, together with the entire absence of nuclei in nearly equal proportions of each. It will also be observed that certain numbers are imperfect in outline, as if affected by disintegration; and this is true of a similar proportion of every specimen that I have ever examined. This apparent analogy of form and feature between mammalian and reptilian corpuscles only supports what is generally acknowledged should obtain with these bodies in order to bring them in harmony with the known homology of other tissues, from whatever species of animal obtained. I believe that it is never denied that nerve, muscular, bony

and other tissues, when compared with their kind, are essentially alike in their anatomical constitution. Why should blood tissue form an exception to this general rule? Do not the corpuscles perform the very same function, whether floating in the blood of a reptile or in the vessels of man?

With one exception I have not, as yet, extended my observations to the condition of blood discs in the various parts of the body. In the spleen pulp I found them mainly imperfect in form, being generally serrated, shriveled, and seldom nucleated. Hæmatine, in granulated masses, was seen interspersed among the corpuscles. White corpuscles, in great numbers, were arranged around the margin of the specimen.

The Illuminator does not reveal any thing unusual concerning the white corpuscles; they merely appear as non-nucleated, globular bodies. It is remarkable, however, that they never associate themselves with the red discs, there seeming to be a perfect antagonism of position.

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\*NOTE.—Those who wish to repeat these observations, by means of Wale's Illuminator, will find it indispensable that the object-glass be arranged for uncovered objects, and the discs spread thinly over the surface of the slide. Corpuscles found in defibrinated blood are the best for observation. Those found in rouleaux do not show the nuclei satisfactorily.

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## CORRESPONDENCE.

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### *The Dynamics of Organic Life.*

BY Z. C. M'ELROY, M.D., ZANESVILLE, OHIO.

No author should ever feel displeased with such a notice of his labors as you were pleased to make in THE JOURNAL

for the first March, ult., of my monograph "On the Dynamics, Principles and Philosophy of Organic Life."

The question of most interest connected with my proposal to regard all diseased action as modifications of the organic processes of constructive and destructive metamorphosis, and to classify all therapeutic agents as they are found, by experience, to promote or retard them, is, undoubtedly, "How will they work practically?"

The same number of *THE JOURNAL* contains the conclusion of a very interesting paper by Dr. Wallihan, of Chicago, "On Super Oxygenation as a Therapeutic Measure, with Notes of Cases Treated." These cases it is proposed to take as examples, for the purpose of ascertaining whether they can be viewed as lesions of nutrition and oxidation, and if the treatment pursued influenced these processes, by either promoting or retarding them; and what were the relations of the pathological conditions, and therapeutic measures employed, to the living organism.

As at once a base and starting point in the investigation the following propositions are submitted:

1st.—A change of matter must occur, simultaneously with every manifestation of force, whether in the organic or inorganic kingdoms of nature.

This proposition, it is believed, is universally assented to by the philosophic and scientific world, and, therefore, needs neither proofs nor illustrations.

2d.—There is neither local disease or local remedy.

This is, perhaps, not assented to by any considerable portion of the medical world. It is so contrary to the teachings of the past, as well as the current ideas of the present, that it may require both illustration and proof. The dogma of "the indestructibility of matter" was the basis from which chemistry leaped into an exact science. "The persistence of force" is the magic formula from which rises exact natural science, and "that there is neither local disease

or local remedy," is the basis from which will grow an exact science of therapeutics and practical medicine. And it can grow from no other. That disease does have local manifestations is certainly true; but the generic totals of constructive and destructive metamorphosis must first undergo modifications. So long as these proceed normally in the individual organism, the result is health, not disease—harmony, ease, not discord or dis-ease. Take the alphabetical catalogue of diseases, examine each separately, from "abortion and abscess," to "wounds, and zona, argenti nitratis," and it will be found that from the slightest headache, to the gravest form of fever, the organic processes of nutrition and oxidation are constantly interfered with; and in proportion to the extent of the interference is the gravity of the diseased action. Regard them as separate entities, and the confusion of therapeutics in the past reigns supreme in the future.

But the limits proposed for this paper will not permit of further proof. It may not be new to either editors or readers of *THE JOURNAL*, but it is new and original with the writer. It underlies the whole contents of my monograph—forms the only safe foundation for a science of therapeutics worthy of the name, as well as a science of pathology; or, for that matter, a science of life—Biology.

Dr. Wallihan has been treating certain cases of disease, by introducing into the system a greater proportion of oxygen than is contained in the atmosphere, and has found certain forms of chronic disease to be greatly benefitted. In the absence of any scientific generalization of the relations of oxygen, as well as disease, to the organic processes of life, he wisely feels his way, by carefully collecting the reported results of its empirical employment, as well as the mode and form in which it has been employed by others in the past. Far be it from me to find any fault with Dr. Wallihan, in the course he has pursued. He has worked with accredited agents, and in the accredited modes of the profession, and has done a good work, for which he deserves,

and no doubt will receive, the thanks of your readers and the profession. His paper very properly winds up with reports of some of his cases, the treatment consisting in simply introducing into his patients' systems an excess of oxygen over that contained in the atmosphere which all breathe.

What does oxygen do in the laboratory of organic life? Beyond all cavil its mission is double—death and life. It is the most potent agent in nature, "promoting destructive metamorphosis." And, as the dynamics of all organic life depend on changes of matter, the surplus oxygen he introduced into his patients' systems added something to the sum of the forces of life. He increased activity in the process of destructive metamorphosis, liberated the necessary dynamic force for "promoting constructive metamorphosis," *i. e.*—death and life. In due time, by thus promoting both destructive metamorphosis and constructive metamorphosis—if he gave his patients the necessary organic material in the shape of good food—the normal velocity of tissue change was restored, and the results, his patients were well.

But examine his cases separately, and more in detail, and see whether, pathologically, the organic processes of nutrition and oxidation were proceeding normally.

Case 1st, presents a patient in whom, certainly, the processes of "constructive and destructive metamorphosis" are sadly deranged. Nutrition is capricious, and waste unequal. The normal velocity of tissue changes are widely departed from. She is what is called "hysterical;" that is, her dynamic harmony has been broken up. But there are no marked structural lesions; they are wholly confined to "constructive and destructive metamorphosis." She probably belonged among "well-to-do people," and did not perform the requisite physical labor to make good her daily normal tissue-waste. No mention is made of summing up the symptoms of the temperature in her axilla, which is to be regreted, as the results of a few days' observation would



have thrown much light on her case. Theoretically, it should have been variable, before treatment, alternately above and below the normal standard; while, after treatment commenced, it should have been above natural; and for the first few days of treatment she should have lost weight.

Now, what did the extra oxygen do? Brought the rate, or velocity of repair and waste up to their normal standard. Constructive and destructive metamorphoses were both quickened, and her thermal condition normal, or slightly above, and steady.

While the excess of oxygen was successful in relieving this invalid in less than a month, it was, probably, by no means the only treatment or means by which she might have attained the same ends. Forced exercise in the open air—hard work, if you please—a visit to the sea-shore, or some saline springs, would have, in all probability, as certainly relieved her, and very likely quite as rapidly, because they would do, in the end, precisely what the excess of oxygen did, viz., bring the organic processes of waste and repair up to their normal standard. "Up to their normal standard" is written understandingly, for no diseased action is above or higher than life. No matter how *high inflammation may run*, in any given case, it will always be found a lower grade than normal of organic life, tending, not to higher life, but to death.

Case 2d.—This patient, a lady, was probably, too, from the "well-to-do" class of people, as well as No. 1. The same abnormal phenomena prominent in both. Neither constructive nor destructive metamorphoses were proceeding normally in her case. The excess of free oxygen given in the commencement of the treatment set up a too rapid waste, not in the region of the kidneys alone, but over the whole system, and it had to be greatly diminished for a few days, and some measures resorted to to retard it. At the end of something over five weeks, a chalybeate was added to the oxygen treatment to promote constructive metamor-

phosis, and when the processes of nutrition and waste were restored to their normal velocity, she, too, returned to her friends, greatly benefited.

In her case, compulsory physical exercise in the open air, combined with a sulphur and chalybeate course of natural mineral waters, would, in all probability, have accomplished the same ends.

Case 3d.—From the same "well-to-do" class as the first and second; the cause of her trouble the same. Not sufficient labor to keep constructive and destructive metamorphosis proceeding at normal velocity. No structural lesions, and, as a consequence, the super supply of oxygen performed its mission with certainty. In something over two weeks they were brought up to their normal velocity, and she, too, recovered.

Exercise in the open air, the sea-shore, or saline springs, would have done the same thing.

Case 4th.—So nearly like cases one, two and three as not to require a repetition of the remarks applicable to them all.

Case 5th.—More complicated, and in a male; but still from the "well-to-do" class. The rate of destructive metamorphosis being too tardy, and elimination imperfect, of course he is a "martyr" to "the dyspepsy." Surely, in his case the lesion is in the altered relations of nutrition and oxidation. He inhales the super supply of oxygen, it burns up his effete tissues, and the debris of tissue metamorphosis, retained in his system, is eliminated; and, as soon as the processes of constructive and destructive metamorphosis are returned to their normal velocity, he, too, is well.

Three months fishing off New Foundland, or a sea-voyage, or a season's work in the turpentine business in the Carolinas, would have accomplished the same ends for him.

Let me say, again, no fault is found with the treatment pursued in these cases by Dr. Wallihan; on the contrary, much credit is due him for his discrimination and success;

but his treatment was, after all, empirical; he had, or at least gives, no philosophy for the mode of operation of the excess of oxygen employed in the treatment of them; but here is a formula that will satisfactorily explain the whole thing:

"Super oxygenation compensates for deficiency of physical exercise or labor, in restoring the normal velocity of tissue-changes, or "constructive and destructive metamorphosis."

Has the purpose for which the paper was written been accomplished? Cannot purpose, means and results in the treatment of the whole catalogue of human maladies be more definitely connected by regarding all diseased action as modifications of the organic processes of nutrition and oxidation, and all therapeutic agencies as promoting or retarding them, than in any other way?

Reference to other therapeutic measures than super oxygenation was purposely avoided in commenting on the salient features of them. Only natural agencies were pointed out. It is very probable they all could have been successfully treated without the direct excess of oxygen in the mode administered. It is very certain that such cases have been successfully treated in my practice by using salines, iodides and bromides, to promote oxidation, with metallic oxides and vegetable bitters—the metallic oxides more particularly in "hysterical" or painful cases, or lesions of force, and simple bitters and iron for the more prominent lesions of mutation—to promote nutrition, and there is no incompatibility or failure in using both classes of agents at the same time. But "well-to-do" people will not work in the open air, nor visit saline springs, nor go fishing off New Foundland, so it is a happy circumstance that super-oxygenation enables us, as well as with other means, to relieve them from enduring the penalties inflicted on them for a violation of the laws of organic life.

## TRANSLATIONS.

*Medical Electricity.*

*The State of our Knowledge Concerning the Application of Electricity to the Treatment of Disease.*

REPORTED TO THE ACADEMY OF SCIENCES, PARIS, BY M.  
BECQUEREL.

I.—Electro-Therapeutics Previous to the Discovery of the Pile.

Whenever an energetic agent is discovered in nature, the physician, who seeks to relieve the sufferings of his patient, tests its action upon diseased organs, in the hope of affecting a cure vainly attempted by medical science. The attempts succeed, observed facts are associated, are co-ordinated, their laws and relations are reduced; there science commences where empiricism ends. The application of electricity to therapeutics is yet in its first phase, although it has already given satisfactory results in certain cases; that they are not very numerous, is attributable, doubtless, to the very complicated effects of this mode of treatment.

The Greeks, more than six centuries before the Christian era, recognized the property, which amber possesses, when rubbed, of attracting light bodies which may be presented to it; credulous of the marvelous, they attributed to every object a soul, to which they assigned miraculous qualities.

From the time of Pliny amber was already sought for its medicinal properties; women and children, in special cases, wore collars of this substance, a custom handed down to our own time, but now almost abandoned. Appian relates that the shock of the torpedo was used for the cure of the gout and of paralysis; a shock which is identical with that of the Leyden-jar.

Vossius adds that in his time it was used for the cure of inveterate headache. To-day electricity is applied to the same diseases.

It appears, according to Thompson, the historian of the animals of western Africa, that from time immemorial, the negro races of central Africa took advantage of the electrical properties of the silurus for the healing of sick children; the children are placed in a bath filled with water, with this fish, which makes its discharges from time to time; the electricity then, perhaps, acts only as an excitant of movements in the muscles, as in gymnastics.

Centuries must be passed before we reach the era of the discovery of the Leyden-jar, 1746; an epoch when the applications of electricity to therapeutics were so greatly extended, that they were then persuaded that the electrical agent was the principle of organic life.

This remarkable experience produced such an effect upon those who first received the shock, that Muschenbrœck wrote to Réaumur that he would not repeat it were all France to be given to him.

The moral effect was such that he was breathless, and that, two days afterward he had scarcely recovered from the emotion and from the disturbance which he had experienced. Winkler asserted, moreover, that the first discharge from the Leyden-jar had occasioned a cramp throughout his entire body, and that his circulation had been so excited thereby that, fearing a high fever, he had resorted to refrigerant remedies. The prejudice against the dangers of experiments with the Leyden-jar having been weakened, its medicinal application began to attract attention. Nollet appears to have been the first who applied the electrical agent to therapeutics; he commenced by investigating the effects which it produced upon liquids during prolonged action; he observed that it accelerated their evaporation, and that this was by so much the more rapid, as the surfaces of the containing vessels were extended.

Boze observed, at the same time, that water electrified

escaped from capillary tubes in the form of rays, instead of drop by drop, as otherwise.

These experiments, whose results depend upon the repulsion excited between bodies similarly electrified, were regarded as decisive by every physician engaged at that time in the application of electricity to medicine; but they made no deduction therefrom; they believed, for example, that they might conclude from them, that electricity accelerated the circulation of the blood; but experience has not failed to demonstrate the reverse.

Bertholon and Jalabert, like Nollet, applied electrical discharge to the treatment of paralysis.

Animals were killed by means of strong discharges, in order to determine the disorders which they would determine. In a frog whose chest had been opened, the lungs were inflated, and were expelled from the body, by the repulsive action of electricity; the heart still continued to pulsate for some minutes.

A strong discharge was passed through the head and the body of another frog; there was a sort of distention of all the limbs; one hour afterward they were restored to their original appearance. This was the first instance of tetanus produced by electricity.

Franklin's theory appeared. It assumed that there existed in every body a certain quantity of electric fluid; if this quantity was increased, these bodies were found to be in a state of plus (positive); if it were diminished, they were in a state of minus (negative) electricity. Physicists and physicians, carried away by this theory, imagined that when the body of man ceased to be in its normal condition, by any disturbance whatsoever of its functions, there was diminution of the electric fluid; in this case it was necessary to administer an additional quantity. This theory, which is now abandoned, is still, however, sustained by some physicians.

In order to apply electricity to the healing art, machines, sufficiently powerful to furnish a continuous current of

sparks, more or less strong, Leyden-jars of different sizes, a cushion and excitors of different forms, were then used, which had been indicated as infallible means of cure. With jars shocks were given; with excitors sparks were drawn from different parts of the bodies of patients. Again, electricity was administered in the form of a bath, as is still practiced to-day. It was believed to have been established that electricity was of some utility:

1st.—In contractions which depended upon affections of a nerve.

2d.—In sprains, etc., when the inflammation is passed.

3d.—In indolent tumors.

4th.—In some cases of paralysis.

But it must be stated, these different modes of treatment were not preceded by physiological experiments.

The remark may be made cursorily that these pathological cases are precisely those in which electricity is applied to-day.

Such was the condition of electro-therapeutics, when Volta made his admirable discovery.

## II.—Electro-Physiological and Electro-Therapeutical Investigations since the Discovery of the Pile.

Galvani having discovered, in 1790, that by arming the muscles and the nerves of a frog, properly prepared, with two different metals, of which one only was oxydizable, as has been recognized subsequently, their simple contact would suffice to produce contractions; this fundamental experiment was the point of departure for the discovery of the pile.

According to Galvani all animals possess specific electricity, which is secreted in the brain, and resides in the nerves, which transmit it to all parts of the body. The common reservoirs are the muscles, of which each fibre should be considered as possessing two surfaces, upon each of which is found one of the two electricities; hence, he compared the muscles to a small Leyden-jar, of which the



nerves are the conductors. He believed that the electric fluid was drawn from the interior of the muscles into the nerves, and from these to the exterior surface of the muscles, from whence there resulted an electrical discharge to which corresponded a muscular contraction.

I only mention this theory because it served as a point of departure for all physicians who were, at that time, engaged in galvanic investigation. When it was announced, a struggle commenced between Galvani and Volta. The latter proved that the electricity produced by the contact of the two metals, that is to say by the oxydation of the zinc, was the cause of the contraction. At one time Galvani was considered victor, when he proved, aided by his nephew, Aldini, that the metallic arc was not necessary to excite contractions, since they were obtained in a frog newly prepared, by placing the crural muscles in contact with the lumbar nerves. Volta replied that this was only a generalization of his principle, according to which all bodies sufficiently good conductors established themselves always, by their mutual contact in two contrary electrical conditions; but Volta was deceived. Galvani had just discovered, conjointly with Aldini, the proper current of the frog, of which Nobili, Marianini, Matteucci and DuBois-Reymond had made a most thorough study. This discovery is doubtless one of the most important which has been made in electrophysiology, for if one day we should arrive at the discovery of the intervention of electricity in the phenomena of life, this discovery would have been the point of departure for investigations which would have been made in this direction. The discovery of the pile startled the School of Medicine of Paris, which nominated a commission to repeat all the experiments made upon galvanism since 1790.

This commission determined that the electricity of the pile penetrates the nervous and muscular organs more profoundly than that from the ordinary electrical machines, and that it provoked lively contractions, strong pricking and burning sensations in localities whose diseased condi-

tions rendered them otherwise insensible to sparks, or to ordinary shocks.

The National Institute, aroused by the general movement which the effects of galvanism had initiated, nominated, in 1799, a commission composed of Coulomb, Sabattier, Pelletan, Charles, Fourcroy, Vauquelin, Guyton and Hallé, to examine and verify the phenomena of galvanism. This commission composed of the most eminent men of the epoch, established a distinction between the electric and the galvanic fluid; it assumed to perceive in the animal organization, a principle in which resided the essence of the mutual relations of the nervous and the muscular systems. The animal arc may be formed of nerves and muscles in mutual contact, as Galvani had discovered. This arc is not interrupted by the section of a nerve or its ligature, provided that the part remain in mutual contiguity during muscular action. It is not so, however, in the case of the living animal, since it suffices to cut a nerve in an animal, or to enclose it in a ligature, in order to deprive it of the faculty of communicating motion to the muscle to which it is distributed. It recognized the fact that galvanic influence appeared to be excited by exercise, and to be recuperated by repose; and here was, for the first time, indicated the fact resulting from the action produced upon a nerve by a continuous current.

The commission advises, very judiciously, in order to secure accuracy in the experiments and in their appreciation, that the state of health of the animal be previously assured, and also the manner in which it has been preserved and nourished up to the moment of the experiment; experimenters have not always had due regard to this wise recommendation.

The commission of the Institute then investigated the application of electricity as a physiological agent, in a scientific spirit.

No estimate can be formed of all the experiments which were made at this epoch, and which led to results too

thoroughly forgotten at this day. We quote two examples only:

Wilson Philips, having cut the nerves of the eighth pair of a rabbit, discovered that by reuniting the two extremities by means of a metallic wire, and by transmitting through them a current, digestion and respiration, which had hitherto been difficult, became easy as soon as the pile was put in operation.

Dr. Andrew Ure experimented upon the body of a criminal immediately after execution, with a pile composed of a large number of elements strongly charged. One of the poles being put in communication with the spinal cord, the other with the sciatic nerve, all the muscles of the body contracted simultaneously, with convulsive movements. Ure succeeded in imitating, up to a certain point, the play of the lungs, by transmitting a current from the spinal cord to the ulnar nerve, he caused the fingers to move with agility; by transmitting a discharge from one ear to the other, and moistening them with salt water, the muscles of the countenance assumed horrible contractions; the action of the eyelids was very marked. This is the first example of the mode of localized electrization at the present day, a mode which was formulated in 1834, in these terms: (*Ann. de Chem. et de Phys.*, 2d série, t. LXVI, p. 27,) by M. Masson, pupil and friend of our celebrated confrère, Savart:

"The property in the induced current of affecting only the points touched, permits the submission to its action of any portion whatever of the body. Thus, by placing two metallic plates upon the extremities of a finger, after having placed them in the current, this latter will only traverse the finger. The importance of this discovery will be readily recognized by those who are engaged in the application of electricity to medicine."

Let us proceed to the application of Voltaic electricity to therapeutics.

Plaff applies it to paralysis of the optic nerve, as Magen-

die has since done successfully, when the paralysis is incomplete.

It has been employed advantageously in paralysis of the extremities, in feebleness of vision, and in amaurosis due solely to defective irritability of the optic nerve; in deafness dependent upon diminished nerve-power; in coryza, and in aphonia; in paralysis of the sphincter ani, and in that of the bladder.

Many other applications have been made, and have demonstrated that actual practitioners traverse the same circle as their predecessors.

Have they obtained more or less success than the latter? Statistical records fail to answer the query. Doctor Fabre Palaprat, subsequently, making use of interrupted voltaic currents, at more or less closely approximated intervals, obtained decided effects in cases of atony or feebleness in the functioning of organs, provided that no lesion or inflammation existed, as well as in some of lymphatic engorgement.

Let us delay a moment before making an exposition of the results obtained by eminent physiologists, who have furnished the data by means of which electricity is more methodically applied to therapeutics to-day than formerly, in order to recall facts which it is necessary to take into consideration, when it is desired to compare physiological effects produced by electrical action to those resulting from mechanical, physical, chemical or vital actions.

Animals have excitable parts, sensitive parts, and parts deprived of these faculties. Haller, who is continually encountered in the paths which lead to physiological experiment, dissected the parts and applied the scalpel, acids, or other chemical agents, in order to detect the special properties of each one of them. He thus examined parts which were agitated, and those which experience sensations of pain. By irritating a nerve or one of its ramifications in a muscle, there resulted an abrupt and rapid movement; when a nerve corresponding to a muscle was too strongly

irritated, and for too long a time, it ceased to contract. The nerve being cut, if it was irritated below the section, the animal experienced no sensation; but the muscle contracted immediately. If the irritation was effected above the effect was inverse. Electricity produced, nearly always, similar results.

Ligation of a nerve arrests the action of the current, as does that of other stimulants; provided it be sufficiently firm. In this case, after detaching the ligature, it is no longer possible to excite contraction by irritating the nerve above the ligature.

M. Matteucci has recognized the fact that poisons do not all act in the same manner, and that, when the animal is killed by electric discharges, the excitability of the nerve by the current is destroyed. This observation ought to be taken into consideration in this regard, that it shows the danger of exciting the nerves too strongly.

Twenty-five years ago (in 1841), in a memoir crowned by this Academy, our associate, M. Longet, demonstrated experimentally the independence of muscular irritability, and of excitability of the motor nerves. This important fact has been confirmed subsequently by our associate, M. Claude Bernard, by the aid of curare; he has, indeed, perceived that the muscles may remain contractile, even when the motor nerves are no longer excitable. The electric current appears to have been the only one of all the excitants tried, applied to muscles, which could induce their contraction without the intervention of nerve fibres. This fact is very remarkable in this regard, that it seems to establish an analogy between the mode of action of electric currents, and that of nerves in producing muscular contraction.

It has been already seen that a nerve too strongly irritated lost the faculty of exciting contraction in the corresponding muscle, and recovered it by rest. The same is likewise true when the current generated by a certain number of pairs has circulated for a certain time between the

muscle and the nerve; the muscle no longer contracts at the opening or the close of the circuit; but if the direction of the current be changed the contractions manifest themselves anew. By reversing, a certain number of times, the direction of the current, the excitability of the muscles of the frog may be arrested or revived at will; it is this which constitutes what is called the phenomenon of voltaic alternatives; but if the organs of a frog, traversed during a certain period by a current of determinate intensity, lose the contractile faculty they have, nevertheless, the power of contracting under the influence of a more energetic current.

The muscles of a frog, which have lost their contractile faculty by the prolonged passage of a current, recover it by repose; the same is true of a living animal; but it is necessary to take into consideration the will of the animal, which might modify the effects of currents up to the point of neutralizing them entirely, especially if the currents have no great intensity, and the animal has a high degree of vitality.

Marianini and other physicians have observed that if the current is directed into the nerve alone, following the directions of the nervous ramifications, that is to say, from the head to the extremities, there is contraction upon closing the circuit and no effect upon interrupting it. If the current traverses in the reverse direction, there is no contraction upon closing the circuit, it is manifested, however, upon interrupting it. There is absence of contraction when the nerve is affected normally longitudinally, as M. Matteucci has demonstrated.

Marianini discovered, moreover, that the current, according to its direction, produced either contractions or painful affections in the frog, as well as in other animals; when the current is direct, going from the head to the extremities, there follow vigorous contractions of the posterior extremities, from the closure; upon opening the circuit the contraction is weaker, the dorsal column bends upon itself

sustains a violent shock, and, it sometimes happens that the animal cries out. With the reverse currents opposite effects occur.

It seemed, then, that the nerve was organized in such a manner as to propagate certain movements in the direction of its ramifications, movements which are only transmitted with difficulty in the opposite direction, and from which results the sensation of pain.

Nobili succeeded in giving tetanus to a prepared frog by interrupting and re-establishing the current rapidly. This effect is due, probably, to change in the condition of the nerve, which passes rapidly from the natural to an artificial state, and reciprocally. It may be asked if tetanus, natural to men and animals, would not originate from similar modifications consequent upon acute pain. If it were so, it could be arrested by utilizing this fact discovered by Nobili, that frogs having tetanus persist in this condition under the influence of a current of a certain intensity, and are frequently completely distended under the action of a current directed in the reverse direction. Experiments conducted in this direction have already given satisfactory results.

The existence of the proper current of animals, as has been previously recognized, was indicated and put in evidence for the first time by Galvani; it was investigated successively by Nobili, Matteucci, and DuBois-Raymond; each had his part in the analysis of this important discovery, by the aid of which it was determined that nerves and muscles are electrometers; that is to say, that they are constituted in such a manner as to afford currents when they form closed circuits; these electro-motors probably sustain a rôle still less understood in the phenomena of life; as their organization would suggest.

Nobili perceived that the contraction produced by contact of the crural muscle and the lumbar nerve was due to an electric current, whose existence he had established, a current extending from the paws to the head; the nerve is, therefore, negative.



M. Matteucci established this fact with the living frog; he showed that the proper current of the frog was not weakened by allowing it to circulate through the animal pile, which will be discussed hereafter, whence he concluded that the extremities of the animal do not paralyze in an appreciable manner; an observation which has its significance, for, were it otherwise, it could not be conceived how the muscles and the nerves could intervene amidst vital phenomena as electro-motors if they did always intervene, since polarization would produce an inverse current which would weaken their action at every instant.

M. Matteucci next discovered that muscles are electro-motors, since a current could be obtained by placing in communication the interior of a muscular mass with its surface. Nobili obtained a stronger current by forming a coronal pile of cups with pairs composed each of a thigh and the corresponding nerve.

M. Matteucci having placed the nerve of a frog prepared after the mode of Galvani, that is to say, the lumbar nerve still connected with a mass of crural muscle, upon the muscle of another frog, he perceived the former contract at the instant when the last muscles were caused to contract mechanically; it might be inferred from this that the contraction of the muscle produced an electric current, reacting upon the galvanoscopic frog. M. DuBois-Reymond having studied this effect deduces therefrom the following consequences:

The transverse section of a muscle is negative, and the longitudinal positive; nerves having no natural transverse section, they must be cut in order to have a current. These laws appertain to the most intimate constitutive elements of muscles and nerves. The electro-motor power ceases after death, when the muscles and nerves have lost their irritability.

At the moment of contraction a sudden and great diminution in the muscular current and in the nerve is detected, when it transmits a motion or a sensation.

A difference exists between muscle and nerve in their electrical relation; when a nerve is traversed throughout a portion of its length by a continuous current, according to its direction, it increases or diminishes the influence of the proper current. This condition cannot occur in muscle.

Nerves of motion and of sensation act similarly.

The investigations of Jean Müller and of M. Longet into the employment of electricity, for the distinguishing of nerves of motion from nerves of sensation, should be mentioned here, in consequence of their importance in electro-therapeutics. M. Longet has likewise made profound investigations upon nerves of sensation, which possess great interest, and which we recommend to the attention of physiologists.

Neither should reference be omitted to the curious experiments of M. Helmholtz, relative to the duration of the phenomena of muscular contraction, and of the transmission of nervous excitation. By means of ingenious processes and apparatus he succeeded in perceiving that the rapidity of the propagation of nervous excitation in the sciatic nerve is about thirty metres per second. Cooling the nerve greatly diminishes this transmission.

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## EDITORIAL.

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In compliance with the wishes of several distinguished members of the profession we crowd out of our columns a large amount of valuable matter in order to give place to the correspondence of Drs. Baldwin and Nott in relation to the next meeting of the Am. Medical Association, feeling that the large majority of our readers will unite with us in a cordial endorsement of the sentiments expressed therein.

FOREIGN ITEMS.

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*Investigations into and Experiments upon the Physiological and Therapeutical Properties of Curare.*

BY MM. AUGUSTE VOISIN AND HENRY LIONVILLE—FROM LA GAZETTE MÉDICALE.

The authors have thus epitomized the principal results of their labors: "It appears to us interesting to indicate some of the most prominent facts which curarie influence, intoxication or poisoning of animals have permitted us to observe.

"From the first, the effect manifested in the economy by the curare has always appeared to us characteristic, and we have never, although observing closely, and varying the doses and the animals, had to confound it with the effect resulting from other poisons, as strychnia, for example, since it is to this that some authors, MM. Martin Magron and Buisson, especially, have compared it heretofore.

The little clonic convulsions which are observed, the fibrillary trembling, which, localized sometimes, are more frequently generalized, this minutely tremulous condition of the body which augments by external impressions received by the animal, and which increases, so to speak, gradually, and extends itself over the whole body, betraying itself by the fibrillary trembling of the muscles, or by the undulatory state of the hairy skin, which seems as though agitated gently by the wind; all these appearances, in a word, are not the tonic, forcible, abrupt, sudden convulsions manifested by an animal under the influence of strychnia. We have not, under the influence of curare, that sort of violent discharge which increases by the most feeble exterior excitement, a slight touch, the least noise,

and which curves, in an irresistible manner, the whole body of the animal, like a cord which bends suddenly the two extremities of an arc. The aggregation of the curaric phenomena, shivering, is one of the manifestations of fever.

Another point which has seemed to us to deserve attention is the possible modifications of temperature during the curaric phenomena.

We have observed a very marked elevation of temperature in the rectum of animals in those instances in which the doses were poisonous. There was indicated, indeed, an augmentation of three to four degrees.

However, the exterior temperature of the whole body of the animal has never seemed to us to exhibit very perceptible modifications, even in connection with the manifestation of discoloration and *heat of the ears* upon which M. Claude Bernard has especially insisted.

But when we have found this latter phenomenon unmistakably manifest in our patients, it was always associated with a very decided augmentation of the *redness and heat of the face*, and this facial redness and heat have always seemed to us the predominant characteristic.

At the same time we may detect noticeable effects upon the circulation, as we believe, contrary to the opinion of certain physiologists, developed during the earlier stages, and subsequently modified considerably if the dose be more active.

In reference to the visual apparatus, we have detected those disturbances which are indicated by modifications in the diameter of the pupils, and we have seen the pupil doubled in size under the influence of curare.

But if the dose be still more active, this augmentation is also more considerable, and soon attains to the double size; then occurs this curious phenomenon: to the augmentation of the pupil succeeds, almost suddenly, a diminution, and even a constriction.

These disturbances have, under our observation, always appeared to accompany another phenomenon, which, we

think, has not, hitherto, sufficiently attracted the attention of experimenters; it is the *double exophthalmia* which supervenes after the employment of active poisonous doses, and which in four of our experiments is recorded with minute detail.

Moreover, we have observed that these different disturbances, those of the pupil, of the injected sclerotic, of the exophthalmic eyes (which we have taken care to complete by examination of the modifications in the sight itself. *Diplopia*, *derangements of accommodation*, observable only in patients capable of describing it accurately, were concomitant phenomena, and might very reasonably be assumed to be simultaneous, and, as it were, associated expressions of the same general state (disturbance of the vaso-motor system, and paralysis of the muscles of the eye).

In reference to the nervous system, the authors have determined anew that curare is a poison of motor nerves; that muscular irritability is preserved intact, and that death from curare poisoning occurs only from abolition of motor power in the entire economy.

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## LOOT.

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*L'Univers Médicale* contains the following results of experiments upon the solubility of diptheritic membranes. Subjected for an hour to the vapor of sulphate of mercury false membrane was not dissolved, and when subjected to the action of a concentrated solution of pepsine, its solution was effected only after twelve hours, which period was shortened to *eight minutes* by the addition of six to ten drops of lactic acid. Neither sulphuric, hydrochloric or nitric acids accomplish the desired result. Acetic and citric acid render diptheritic membrane transparent but do not dissolve it completely. Two drops of lactic acid in five grammes of water dissolved twenty centigrammes of tough membrane in three minutes. Lime water produced the

same result still more rapidly; lactate of lime is inert. Weak solutions of soda and potassa dissolved the membrane in eight or ten minutes, and better than when concentrated. Nascent bromine and bromine water only disintegrate the membranes; bromide of potassium and the sulphates, bicarbonates and nitrates of soda and potassa. Chloride of zinc and chromic acid are without action. The chlorates of potassa and soda dissolve membranes but slowly.

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### ***Monstrosity.***

Dr. O. C. Gibbs, of Frewsburg, N. Y., reports to the *Lancet and Observer* the birth of a monstrosity characterized by the absence of cranial and spinal bones, of the entire integument, and of the spinal muscles from the third cervical to the fifth lumbar vertebra, also of the anterior muscles; the liver, stomach and heart being exposed. The brain, enclosed in its membranes, hung suspended down the back.

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### ***Fragilitas Ossium.***

Dr. Joseph Jones, of the University of Louisiana, reports to the *St. Louis Med. Archives* the case of a dark mulatto who had sustained, from the most trivial accidents, fractures of the extremities to the number of fifty, by reason of which he had become completely dwarfed and misshapen, and unable to walk except with the use of crutches. The parents were healthy, and the condition of their son was attributed by them to the results of an attack of typhoid fever which was treated with large doses of calomel, which the Doctor does not endorse. Dr. J. indicates the following points of interest in this case.

1st.—The painless character of the fractures.

2d.—The integrity of the general health, and the absence of allevidences of syphilitic or scrofulous cachexia or taint.

3d.—The constitutional origin and hereditary character of the disease was indicated by the brittle state of the bones in a cousin of the subject.

### ***Prolapsed Funis.***

Dr. Yarnall reports to the St. Louis *Med. Archives* fifteen cases of prolapsed funis occurring in the practice of Dr. Papin, of that city, in which reduction was accomplished by placing the patient upon her elbows and knees, the pelvis being elevated, and passing the loop within the womb, beyond the promontory of the sacrum, and retaining it there until the head was again engaged in the superior strait. Of the fifteen cases ten were born alive, and five died, one from compression of the cord by the forceps, one from severing of the cord by the same instruments, a third from the two free administration of ergot, and the remaining two from impossibility of retaining the replaced cord, in consequence of the transverse position of the fœtus.

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### ***Monstrosity.***

Dr. Steele recently presented to the St. Louis Medical Society a double headed monstrosity; a large and well-developed double-headed male child, having two entire and separate vertebral columns; two sacra separated by a rudimentary mass of bone; a single pelvis; two legs; three arms, the third or middle one between the heads having one humerus, (double-headed, *i. e.* having two articular facets,) one ulna, two radii, and two hands, (the palms approximating,) with two thumbs and seven fingers, the little fingers being merged into one, one bifurcated sternum, the ribs of the opposite sides articulating with it; the posterior ribs fused, making a median line resembling a third vertebral column; four scapulæ, the two median being confluent at their superior angles; two normal stomachs, with intestinal canals distinct for their upper two-thirds, and merged and single for the lower third; one rectum, one anus; two pairs of lungs and two hearts normal, one liver formed of two right lobes fused and contained in a common investment; two gall bladders, the right rudimentary; two spleens, one to the right, anterior, and the other to the left, posterior, in the thoracic cavity, into which they had escaped from the abdomen through an opening, one inch and a half in diameter, in the left leaflet of the diaphragm; two kidneys; one bladder and one penis.—*St. Louis Med. Arch.*



Dr. Baldwin desires the medical journals of the country to publish these letters in full or to give an analysis of them in April.

E. S. GAILLARD.

*Advance Sheets of the Richmond and Louisville  
Medical Journal for April, 1869.*

[LETTER I.]

MONTGOMERY, ALA., March 15, 1869.

DR. E. S. GAILLARD, EDITOR RICHMOND AND LOUISVILLE  
MEDICAL JOURNAL:

MY DEAR SIR:—I send you this letter and the inclosed correspondence between Dr. J. C. Nott and myself, for publication in your journal.

You must pardon me, dear doctor, for the personal allusion contained in this correspondence to yourself. From the fact that you were an active participant in the late war, and suffered deeply by its results, and from the additional fact that you have occupied a prominent position in the medical profession before and since the war, I thought I might take the liberty of referring to you as a true representative of the professional sentiment of the South.

For the same reason I addressed a communication to Dr. Nott, (formerly of Mobile, now of New York,) whom it is well known, was a staunch adherent of the Confederate cause; who, at the advanced age of sixty years, gave up his professorship in a college to which he was devoted and of which he was the founder; relinquished his large and lucrative practice and neglected his then ample fortune to take a commission in the army of the South; serving in hospitals, in camp, on the march, in the front or wherever he was ordered, with all the devotion and faithfulness of his enthusiastic and honest nature. He had but three children, all sons; one lost an arm in infancy; the others, promising in a ripening manhood all that a father's heart could desire; both of these went to the field at the first call for troops and both perished in the army.

When such men as yourself and Nott, from the medical profession, and Gen. Wade Hampton, from the head and front of the army—all *representative men*—men who have, in the time of her greatest need, rendered distinguished services to the South, who have been torn and mutilated in

person, lacerated and crushed in affections, wrecked and ruined in fortune, can take the proffered hand of friendship and urge conciliation, harmony and fraternization for the good of science and the welfare of the country, I think the personal allusion which I have made to you is pardonable, while it should put to the blush those few "who still urge discord and alienation."

I do not think that a charge of egotism could lie against you in consequence of your publishing what *I think* or say of you. In justice to me you can not omit the reference to you, for, by so doing, you would manifestly defeat one object of the letter. I have seen proper to use your name as a *representative man*, and in a manner to serve a purpose which is obvious throughout the letter, and the *facts warrant the allusion*.

I am, dear doctor, very sincerely yours,

W. O. BALDWIN, M.D.

[LETTER II.]

MONTGOMERY, ALA., March 2, 1869.

DR. J. C. NOTT, NEW YORK:

MY DEAR DOCTOR:—As you are aware, the next meeting of the American Medical Association, is to be held in the city of New Orleans, on the first Tuesday in May next, and I write to urge you to be present on that occasion. Your numerous old friends in the South would be most happy to meet you there; to shake you by the hand in this fraternal reunion, and to welcome you again to the scenes of your morning life. It must be gratifying to you to know, my dear, good old friend, when, in your solitary moments, memory sometimes takes you back to the home of your youth, (to review the incidents of almost a life-time spent in active and arduous professional duties,) that your cotemporaries here, who witnessed your devotion to the cause of science, whilst they appreciated the value of your labors, still hold in most affectionate remembrance that honorable courtesy and charity which ever distinguished your conduct towards your professional brothers. I am glad to be able to say, my dear doctor, that the spirit of your example still lives with us, and, I believe, will teach us from the grave; will teach those who still labor in the fields you have left, when life with you shall have ended its hardest lessons. Nothing, I assure you, would give me, individually, more pleasure than to see your honest face on that occasion. It

will be such a fitting time for you to meet us, and one which will probably never present itself again, when you could see so many of your old friends.

My correspondence has been somewhat extensive during the past eight or nine months, and I feel justified in saying that the great mass of the profession South is in full accord and sympathy with the Association. You may have seen some little dissatisfaction expressed in newspapers over a *nom de plume*, indicating the author to be a physician, but I assure you such sentiments are confined to but very few, and have failed to reach the great heart of the profession. I was grieved, however, to see even this manifestation of opposition to the great representative interests of the medical profession of this country. It has no root and can bear no fruits in science or general beneficence.

This dissatisfaction grew out of the action of the Association at its meeting in 1864, in relation to a preamble and resolutions introduced by Dr. A. K. Gardiner, of New York. These were, in fact, a remonstrance against the war ethics of the Government, and, in substance, provided that the President of the United States, heads of departments and members of the United States Senate be requested by the Association to "take such action as shall cause all medicines and medical and surgical instruments and appliances to be excluded from the list 'called contraband of war.'" The action taken on these resolutions by the Association was to lay them on the table indefinitely, and which, in parliamentary *parlance*, I believe, means that it was "not desirable to consider them" at that time. From this action some have contended that the Association lent its influence and support to sustain the Government in this feature of its ethics of war.

The beautiful preamble and resolutions referred to, as having been introduced by Dr. Gardiner, are certainly a most graceful proof of a noble and generous mind, and must be regarded by all as the offspring of the purest and most unselfish charity and benevolence. Yet how far the language used by others in commenting upon this action of the Association is justified by the facts; how far this body lent its influence and support to the Government in the policy complained of, or to what extent it committed itself to the principle, by laying these resolutions on the table, are questions which may very well admit of difference of opinion.

No member can claim for the Association exemption from fair, frank and honorable criticism, and when thus conducted amongst ourselves, or through the legitimate channels of *medical* periodicals, with moderate language and in a courteous and respectful temper, I can see no objection to it, and think it may, in the end, lead to harmony of sentiment and unity of purpose. I have been particularly grieved, however, to see that some, in their zeal to discuss the points above referred to, have resorted to the columns of *newspapers*, (devoted to common and general politics,) for this purpose. The public feel no particular interest in controversies like this, and, in the language of our code of ethics, "as there exists numerous points in medical ethics and etiquette through which the feelings of medical men may be painfully assailed in their intercourse with each other, and which cannot be understood or appreciated by general society, \* \* \* \* \*

publicity in a case of this nature may be personally injurious to the individuals concerned, and can hardly fail to bring discredit upon the faculty." These injunctions, though applying to our daily intercourse with each other, are equally applicable to us in our associated and general relations.

I am not prepared to say what the usages of modern warfare are on the points raised in Dr. Gardiner's resolutions, or whether there are any recognized or established ethics among civilized nations on this subject. But that it is in accordance with the purest and highest dictates of humanity for belligerent powers to allow the enemy's sick and wounded to be supplied with medicines and surgical appliances from within their own lines, when they cannot be otherwise obtained, I think none will deny, unless the supply be at a time when such action might thwart the movements or prejudice the safety of an army. And, if the duty of regulating such matters had been assigned to the American Medical Association, or even to the army medical corps, and they had established, or advised the establishment of an ordinance making these articles contraband of war, I should feel that their action had not harmonized with the spirit which has ever characterized the conduct of our profession toward suffering humanity.

This, however, was not the case, and I can very well imagine that those who voted against the Association taking the action urged in the preamble and resolutions

referred to, could give good reasons which influenced them, at that particular time, to desire no complication with their Government upon a question, in the discussion and decision of which they were regarded as in no way authoritative, and the direction of which had been assumed by high government officials, who had long since established and practiced a policy in reference to it.

I assume, then, the broad ground that it was a question with which the Association had nothing whatever to do, and one which was not properly before it for discussion; and, it seems to me that it was expecting too much of our Northern brothers to suppose that they, at a time when all the sinews of war were called most vigorously into execution, would place themselves in antagonism to their government upon a question which was entirely outside of their *professional position and accredited duties*. In doing so, they certainly would have been transcending their legitimate sphere, and meddling with the prerogatives of those to whom the regulation of the ethics of war had been assigned and who claimed exclusive jurisdiction over the question.

Subjects of this kind certainly formed no part in the plan of their organization. They were there solely for the purpose of discussing questions purely scientific and professional, and not such as grow out of civilized warfare. Whatever, therefore, was objectionable in the ordinance alluded to, the high functionaries of the government were alone responsible for it. It was a political and war measure with which the Association had no more to do than did the Pope of Rome or the worshipful grand master of a Masonic Lodge, or any other humane or charitable individual or Christian and benevolent organization in the land. In fact, every man in Christendom was as much to remonstrate with the Government for any violation of the rules of civilized warfare, as were the members of the Association.

It is a very serious and forced conclusion to say, that the Association gave its influence and support to the Government to maintain it in this policy, because it refused at that particular juncture to enter its protest against it, by the adoption of these resolutions. If, *as an Association*, they had assumed a vindictive or hostile attitude towards the South and advised the adoption of this or any other unjust proceeding on the part of the Northern government, there would have been just reasons for complaint on the

part of Southern physicians. This, however, was not the case. The Association simply held itself *firmly* to its *professional position*, to its *acknowledged sphere*, to its *accredited duties*, and refused to go outside of that position to discuss a question which concerned that body no more than it did any private individual in the land.

It is not wise, nor is it required by any creed of general courtesy or ethics, that honor shall always forbid that which honor fails to sanction. Men are not expected or required to denounce every measure of which they cannot approve. There are often good reasons why they should not. Are they then to share the odium of measures entirely foreign to their sphere and beyond their control? There is certainly much difference between the man who commits crime and him who fails to remonstrate with the criminal! As well might we reproach and rebuke the high court of chancery for failing to lecture the world on the subject of religion, the giving of alms to the poor, or for any other philanthropic work which might be calculated to lessen the woes and mitigate the sufferings of fellow beings.

Society, and especially governments, has assigned to different individuals and classes their peculiar sphere and respective duties, and the world owes much of its harmony to this fortunate arrangement. We have our own code of ethics and etiquette, and our own standard of morals, and, if we adhere strictly to these, we cannot interfere with the ethics of war established by ordinances of government. One of the great reconciling principles in the philosophy of life is a proper regard for the rights, duties and principles of others. Whilst, by the very nature of our calling, we are intimately connected with the interests of humanity, and should labor by every means at our command to promote its benefactions, we must be careful in our zeal for a good cause not to hazard the position and influence already gained, by invading the precincts and prerogatives of others.

The restraints and usages of governments in times of war may seem to us, in many particulars, unnecessarily harsh, oppressive and cruel, and, indeed, what civilian ever witnessed the operation of martial law who could not find grave objections, both to its humanity and equity? But when these have been ordained by persons to whom we are only subordinate, we cannot be responsible for results, and should, in no way, share the odium, simply by failing to place ourselves in open antagonism to them.



As long as we labor with all the professional, intellectual and moral efficiency at our command, for the fulfillment of duties properly within our legitimate and recognized sphere, we shall have accomplished all the good for humanity that the world can reasonably expect or require of us.

But even suppose the Association did commit an error, in fact and in spirit, in failing to remonstrate with its government as stated, where is the wisdom, at this day, of opposition to its future and permanent interests? Suppose that the feeble assaults which have been made upon it should swell into an hostility whose magnitude should in the end mar its progress, compass its disorganization and defeat its claims to a grand nationality, who could receive credit for such a work? Where would be the glory of success or the fruit of such victory? Could science, could humanity, could the country thank one for such a service?

What has brought the science of medicine to its present state of advancement but the labor of *intellects combined in organization*? Like the tiny insect which lays up its stores for the wants of winter, we, too, must acknowledge the great law which sanctions the wisdom of associated labor. The imperishable grandeur and usefulness of all sciences owe their highest development to organized effort. The future glories of the science of medicine in this country, lie embodied in the powers yet latent in organization, and he who seeks to disturb this great element in its prosperity is no friend to progress.

The animus of the Association has shown itself to be honorable and kind in every reference made to its Southern members, during and since the war; honorable to itself, honorable to the profession, honorable, just and generous to the South. When I went to its last meeting (in Washington) I did so from a sense of duty, and with the earnest desire of seeing the two sections united in their professional relations and purposes. I did not solicit any honors, and asked no man to vote for me for any office. Yet with a meagre representation from the South, they conferred upon me the highest office in their gift. I knew myself unworthy of the high distinction, and felt it was not intended for me. I knew it had a broader and higher significance than that of a mere tribute to personal and private ambition. I knew it to be in keeping with that kindly spirit displayed by the Northern delegates towards their Southern brethren throughout their "Transactions," and that it was but a fresh offering of the olive branch of peace. In this spirit I



accepted it. No man asked me any thing in relation to my political sentiments. I cannot boast of performances in the late struggle, but I have never disguised the fact from any one, that in all the earnest desires of the heart which constitute devotion to a cause, I yield to none in my loyalty to that which has gone down in the gloom of defeat and for which those tender youths, your son and mine, fought side by side, and fighting fell for principles held dear by you and me. I would not stultify myself on this point for all the honors which could be heaped upon me by the medical profession or any other class of men. Nor do I think my Northern brothers would respect me more for being false to my section. In the death of my boy I found the hardest heart-sorrow of my life, and the weary years which have since passed by have been powerless to still its anguish; and yet I could but feel a mournful pride in a knowledge of the fact, that he died on the field of glory and true to the land which gave him birth.

But the crushed affections and blighted hopes of the father, who has yielded a noble sacrifice to his country, as he sits in silent and sacred memory of his holiest grief, can find no relief by barbing the anguish of his heart with feelings of malice, hatred and revenge towards those who, in honorable combat, had been made the instruments of his sorrow. Natural affection does not require this; true manliness does not demand it.

No, Doctor, I do not wish to cherish feelings of bitterness with the memory of my son. I wish to forget all that is painful and harrowing to the heart, and to remember him as he was, the soldier, patriot and Christian, falling in honorable warfare, and, that the hand which sent the fatal ball which deprived him of life, was that of some brave and generous spirit, moved by the same high purpose, the same stern sense of duty, the same devotion to principle and country, which guided and actuated him. So far from entertaining sentiments of unkindness towards our brothers of the medical profession North, growing out of this affliction, my only feeling has been, that if any one of them had been near him in that dreadful hour, his highest care would have been to have drawn, if possible, the fatal ball from his breast, and restored him to life and health.

How unwise and unprofitable it is to seek to mingle the temper of partizan strife with the affairs of a great science. If the gallant General Hampton, whose blood flowed so freely in the late war, and whose home, with the homes of

his people, was consumed and made desolate by the flames of the Northern army, can speak gratefully of "the spirit of conciliation, the magnanimity and the kindness" of those "who recognize us as no longer foes but brethren," can, for his country's good, declare his willingness to bury "all past differences in one common grave," to "accept the right hand of fellowship \* \* \* so frankly extended," and greet, as a "comrade," him whose hand "so lately grasped the sword," but now bears the olive branch of peace," shall we be so sectional and prejudiced as to nurse feelings of hostility towards a brotherhood, from whom we have ever received only evidences of marked kindness and honorable courtesies?

If the talented and independent editor of the Richmond and Louisville Medical Journal, Prof. E. S. Gaillard, who lost his right arm, when a medical director, in the discharge of surgical duties on the field of battle, thus depriving him of all hope of further advancement in the special department which had been the choice of his youth, for which genius, education and a thorough method had so well prepared him, and to which the achievements of early manhood had already given such brilliant promise of successful ambition; I say if he can advise that we should cover over the past "with the mantle of personal and professional charity," that we should "take the out-stretched hand, accept the offer of friendliness and reconciliation;" and that the reception of the "*medical men of America*," when they assemble in New Orleans, in May next, should be "not only a hospitable reception, but a warm, a manly and a generous welcome," cannot those who never felt a wound, and can even jest at scars, lay aside feelings which can neither yield fruits to our noble science nor do honor to our manhood? Is any one vain or weak enough to believe that our Northern brothers will derive an advantage from fellowship, union and harmony which we will not share in an equal ratio?

Pardon me, dear doctor, for trespassing so long upon your valuable time. I know you will excuse it in the interest which you feel in the general prosperity of the medical profession of the whole country, and especially in the desire which you feel to see your Southern friends come fully up to their duty, in meeting the honorable advances which have been made by our Northern brothers, looking to a complete and perfect fraternization. I think the

American Medical Association is to be the power through which a greater good is to be accomplished for the profession in this country, than has yet been achieved. On this point you may, perhaps, hear from me at some future time. I will only say now, that its organization had its inception chiefly in an idea which has not yet been realized—that of elevating the standard of medical education in this country. But I believe its labors in this direction will yet be felt and acknowledged. To this end *it must be national* and represent the interests of the profession in every part of the country. Those who comprehend the grandeur of its germ, appreciate full well the ultimate possibility of its nature, and will see to it, that the inspiration which gave it birth shall be worked to a successful end. The advancement of science, the affections of an enlightened brotherhood, the interests of society and the good of humanity are all united with it, and from every section I have the most gratifying assurances of a determination to bury all other sentiments in the one great purpose of promoting harmony and concert of action, with the kindest feelings of fraternal regard. Assure our friends of the North of this, and tell them we desire to meet them in large numbers in New Orleans in May.

With assurances of the highest regard, believe me, dear doctor, most sincerely and truly your friend,

W. O. BALDWIN, M. D.

[LETTER III.]

NEW YORK, NO. 4 WEST TWENTY-SECOND STREET, }  
March 8, 1869. }

W. O. BALDWIN, M.D. :

MY DEAR DOCTOR :—Your letter of the 2d has just come to hand. I hasten to reply by return mail.

Whilst I am fully sensible that your kind feelings for me have tempted you to speak in terms of praise beyond my merits, I have the vanity to believe that you do not over-estimate my high sense of obligation to our noble profession; my unceasing efforts to uphold its dignity, and my endeavors to promote friendly feelings amongst its members. I have always maintained that we could not deserve or command the respect of the world, unless we respected each other, and preserved a proper *esprit de corps*.

When I was about to take my farewell of the people of Mobile, among whom I had lived for thirty years, the lead-

ing citizens gave me a public dinner, and the members of the profession a handsome reception, at which I was presented with a piece of plate, on which was engraved the name of every regular practitioner of the city. This, to me, was the crowning glory of a long career, as it was the grateful evidence to me that my constant efforts to keep the members of the profession together in brotherly love and usefulness had not been in vain.

You may well believe then, my dear friend, that your present efforts in the same good cause, on a wider field, meet my hearty approbation and sympathy. I have nothing to suggest in addition to your excellent letter, which covers the whole ground at issue; it is temperate, honest, manly, and in every way becoming the high and responsible position in which you are placed. I doubt not it will be responded to by the profession North, South, East and West, in the same spirit in which it was conceived.

The construction you have given to the action of the American Medical Association, on the preamble and resolutions of Dr. A. K. Gardner, to which you refer, corresponds precisely with what I have heard expressed by all the members of the profession I have met at the North. The time of the Association was fully occupied with matters that properly belonged to it, and these resolutions, trenched upon political or military considerations which were foreign to the business of the Association, which they could not influence. Any debate upon them might have led to some unpleasant remarks from some impetuous member, and it was therefore, best to lay them on the table. If such resolutions had been laid before any hundred members of our profession, during the war, at the South, what, let me ask you, would have been the result? There is a statistical law that throws a certain per cent. of unwise heads into every assembly of this kind, and the less opportunity they have of talking, the better.

Now, sir, I beg leave to say a word of my personal experience, since the war at the North. Soon after the war was closed, I was summoned to Washington as a witness in the Wirz trial, and seized the occasion to run over to Philadelphia to see what I could discover that was new, in the way of books, instruments, practice, etc., we having been shut out from the world for four years. Not only did the medical gentlemen of Philadelphia receive me politely, but they seemed to feel as if they thought I might feel some

delicacy in presenting my rebel face in their midst, and were more desirous, than I had ever seen them, of treating me with hospitality.

About a year ago I came to pitch my tent in the city of New York, determined to ask no favors of the members of the profession, and not one of them can say that I ever solicited an introduction to him; and yet it would seem like egotism were I to tell of half the respect, the hospitality and kindness I have received, both in and out of the profession in the city of New York. It is but justice to the faculty in New York to say that in tone, talent and attainment, it will compare favorably with that of the large capitals of Europe.

But, suppose we admit that the action of the Association on the resolutions of Dr. Gardiner was dictated by sectional and unchristianlike motives, this does not alter the case. The war is over; our prosperity and happiness depend upon our return to the former status of the country, politically and socially; passion and prejudice should be laid in the grave with the half million of brave men that have been buried in the bloody strife. The olive branch has been gracefully and cordially tendered by our medical brethren at the North to those at the South, and it is your duty to accept it frankly and in good faith.

The medical profession has a great mission to fulfill. Medicine is not only a healing art, but is the mother of anatomy and physiology in their most extended sense; of botany, chemistry, mineralogy, geology, etc., in fact, of all the natural sciences, from which have sprung the useful arts. It has been the great fountain, from which has flowed the elements of civilization, from the foundation of the Egyptian empire to the present day.

Now, my dear friend, will the medical profession at the South be outdone in magnanimity? Will they permit a petty pique, or even the remembrance of a great civil war, in which, perhaps, we were all to blame, to cross the path of science, and to mar a great enterprise like that of the Medical Profession?

God forbid! My many old friends must throw aside all minor considerations and come forward in sustaining your efforts to maintain the true honor of the South, the dignity of our profession and the cause of humanity.

Very truly, your friend,

J. C. NOTT.